

Claims:

1. An isolated binding member comprising at least one binding domain capable of specifically binding *Streptococcus pneumoniae* surface adhesin A (PsaA) protein, said binding domain having a dissociation constant K_d for PsaA which is less than $1 \times 10^{-6}M$.
2. The isolated binding member according to claim 1, wherein the isolated binding member is a pure isolated binding member.
3. The isolated binding member according to claim 1, wherein the binding member is selected from antibodies or immunologically active fragments of antibodies or single chain of antibodies.
4. The isolated binding member according to claim 3, wherein the antibodies are selected from monoclonal antibodies, polyclonal antibodies or mixtures of monoclonal antibodies.
5. The isolated binding member according to claim 1, wherein the binding member is monospecific towards the PsaA protein.
6. The isolated binding member according to claim 1, wherein the binding member is bispecific having at least one portion specific towards the PsaA protein.
7. The isolated binding member according to claim 1, wherein the binding member is multispecific having at least one portion towards the PsaA protein.
8. The isolated binding member according to claim 1, wherein the binding domain is carried by a human antibody framework.
9. The isolated binding member according to claim 1, wherein the binding domain is carried by a humanised antibody framework.
10. The isolated binding member according to any of the preceding claims, wherein said binding domain recognizes an epitope in the N-terminal part of PsaA.

- 5 1.1. The isolated binding member according to any of the preceding claims, wherein said binding domain recognizes an epitope in the N-terminal 100 amino acid residues of PsaA.
- 10 12. The isolated binding member according to any of the preceding claims, wherein the binding domain comprises an amino acid sequence selected from SEQ ID NO 2, from SEQ ID NO 4, from SEQ ID NO 6, and from SEQ ID NO 8 or a homologue thereof.
- 15 13. The isolated binding member according to claim 12, wherein the binding domain comprises at least two amino acid sequences selected from SEQ ID NO 2, from SEQ ID NO 4, from SEQ ID NO 6, and from SEQ ID NO 8 or a homologue thereof.
- 20 14. The isolated binding member according to claim 12, wherein the binding domain comprises at least SEQ ID NO 4, and SEQ ID NO 6, or a homologue thereof.
- 25 15. The isolated binding member according to claim 12, wherein the binding domain comprises SEQ ID NO 2, SEQ ID NO 4, and SEQ ID NO 6, or a homologue thereof.
- 30 16. The isolated binding member according to claim 12, wherein the binding domain comprises SEQ ID NO 8, or a homologue thereof.
17. The isolated binding member according to any of the preceding claims, wherein the binding member is capable of binding PsaA from two or more different *Pneumococcus* serotypes.
18. The isolated binding member according to any one of claims 12-17, wherein the homologue is at least 60 % homologous to one or more of the sequences selected from SEQ ID NO 2, from SEQ ID NO 4, from SEQ ID NO 6, and from SEQ ID NO 8, such as at least 65 % homologous such as at least 70 % homologous, such as at least 75 % homologous, such as at least 80 % homologous,

such as at least 85 % homologous, such as at least 90 % homologous, such as at least 95 % homologous, such as at least 98 % homologous.

- 5 19. The isolated binding member according to any of the preceding claims, wherein said binding member is capable of binding to an epitope on PsaA, said epitope being recognized by the binding member as defined in any one of claims 12-16.
- 10 20. The isolated binding member according to claim 1, wherein the dissociation constant is less than 5×10^{-9} M, such as less than 1×10^{-9} M.
21. The isolated binding member according to any of the preceding claims, wherein the binding domain is located in a V_L domain.
- 15 22. The isolated binding member according to any of the preceding claims, wherein the binding domain is located in a V_H domain.
- 20 23. The isolated binding member according to any one of claims 12-15, wherein the binding domain is arranged as a complementarity-determining region (CDR) in the binding member.
- 25 24. The isolated binding member according to claim 2, wherein the fragment of antibodies are selected from Fab, Fab', $F(ab)_2$ and Fv.
- 25 25. The binding member according to any of the preceding claims, comprising at least a first binding domain and a second binding domain, said first binding domain being capable of specifically binding Streptococcus pneumoniae surface adhesin A (PsaA) protein, and said second binding domain is different from said first binding domain.
- 30 26. The isolated binding member according to claim 25, wherein the second binding domain is capable of specifically binding a mammalian protein, such as a human protein, such as a protein selected from CD64 or CD89.
- 35 27. The isolated binding member according to claim 25, wherein the second binding domain is capable of specifically binding a mammalian cell, such as a human

cell, such as a cell selected from a leucocyte, macrophages, lymphocytes, neutrophilic cells, basophilic cells, and eosinophilic cells.

- 5 28. The isolated binding member according to claim 26, wherein the second binding domain is capable of specifically binding a *Pneumococcus* protein.
- 10 29. The isolated binding member according to claim 28, wherein second binding domain is capable of specifically binding a PsaA epitope different from the first binding domain.
- 15 30. The isolated binding member according to claim 25, wherein the binding member comprises two binding domains.
31. The isolated binding member according to claim 30, wherein the two binding members are linked through a spacer region.
32. An isolated nucleic acid molecule encoding at least a part of the binding member as defined in any one of claims 1-31.
- 20 33. A vector comprising the nucleic acid molecule as defined in claim 32.
34. The vector according to claim 33, comprising a nucleotide sequence which regulates the expression of the antibody encoded by the nucleic acid molecule.
- 25 35. A host cell comprising the nucleic acid molecule as defined in claim 32.
36. A cell line engineered to express the binding member as defined in any of claims 1-31.
- 30 37. A method of detecting of diagnosing a disease or disorder associated with *Pneumococcus* in an individual comprising
- 35 - providing a biological sample from said individual,
- adding at least one binding member as defined in any of claims 1-31 to said biological sample,

detecting binding members bound to said biological sample, thereby detecting or diagnosing the disease or disorder.

- 5 38. A kit comprising at least one binding member as defined in any of claims 1-31, said antibody being labelled.
39. A pharmaceutical composition comprising at least one binding member as defined in any of claims 1-31.
- 10 40. The pharmaceutical composition according to claim 39, comprising at least two different binding members.
- 15 41. Use of a binding member as defined in any of claims 1-31 for the production of a pharmaceutical composition.
42. Use of a binding member as defined in any of claims 1-31 for the production of a pharmaceutical composition for the treatment of Pneumococcus infection.